COSEL

参考資料

TEST DATA OF TUNS50048

Regulated DC Power Supply
October 1, 2014

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COSEL CO.,LTD.

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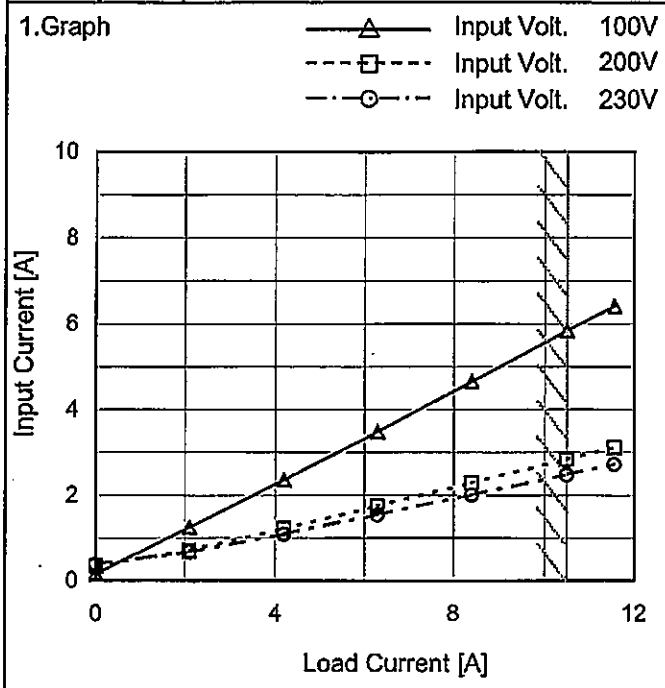

Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Input Current [A]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	0.164	0.339	0.391
2.10	1.251	0.701	0.665
4.20	2.361	1.214	1.093
6.30	3.486	1.744	1.543
8.40	4.652	2.286	2.007
10.50	5.839	2.836	2.481
11.55	6.413	3.113	2.721
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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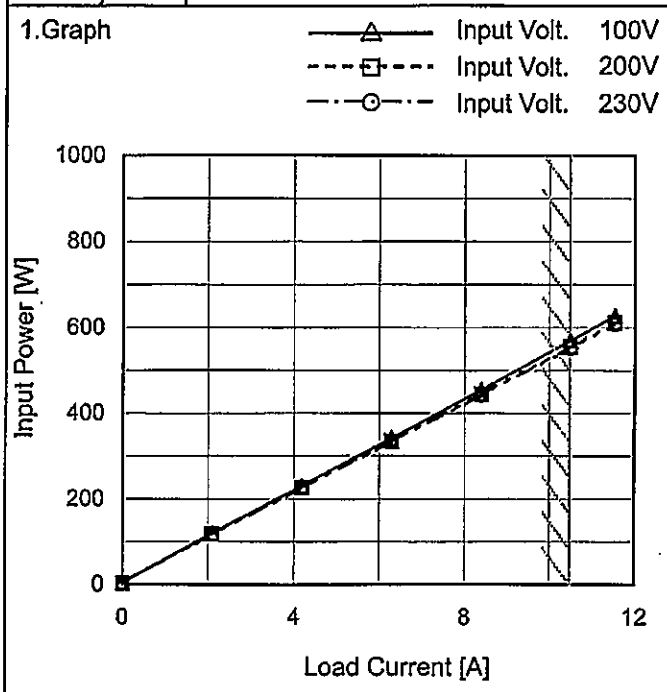
Model	TUNS50048
Item	Input Power (by Load Current)
Object	———————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Input Power [W]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	3.4	3.2	3.2
2.10	120.1	117.2	116.6
4.20	231.1	225.9	224.8
6.30	342.3	334.7	333.1
8.40	455.0	444.4	442.5
10.50	569.6	555.1	552.6
11.55	627.0	610.6	608.0
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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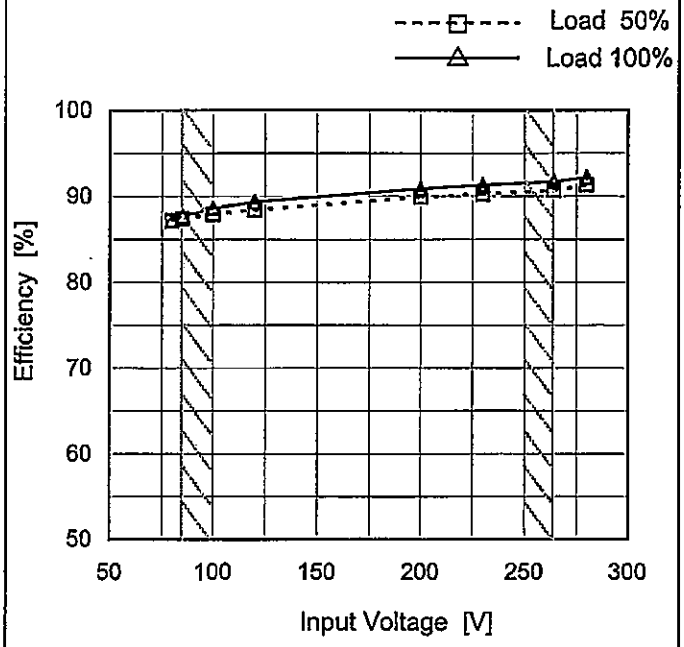
Model	TUNS50048
Item	Efficiency (by Input Voltage)
Object	———————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated input voltage.

2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
80	87.1	87.3
85	87.4	87.7
100	87.9	88.6
120	88.4	89.4
200	89.9	90.9
230	90.3	91.3
264	90.7	91.7
280	91.3	92.2
--	-	-

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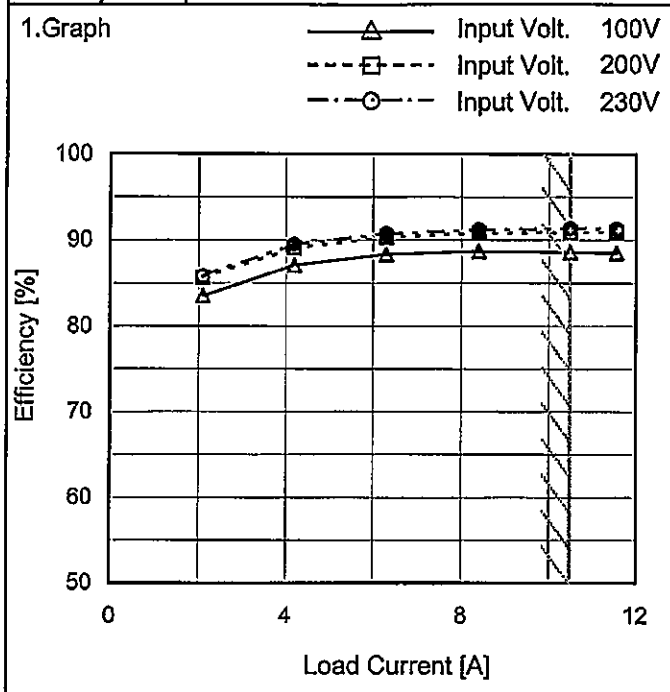
Model	TUNS50048
Item	Efficiency (by Load Current)
Object	———————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	-	-	-
2.10	83.5	85.6	85.8
4.20	87.1	89.1	89.5
6.30	88.4	90.3	90.7
8.40	88.7	90.8	91.2
10.50	88.6	90.9	91.3
11.55	88.6	90.9	91.3
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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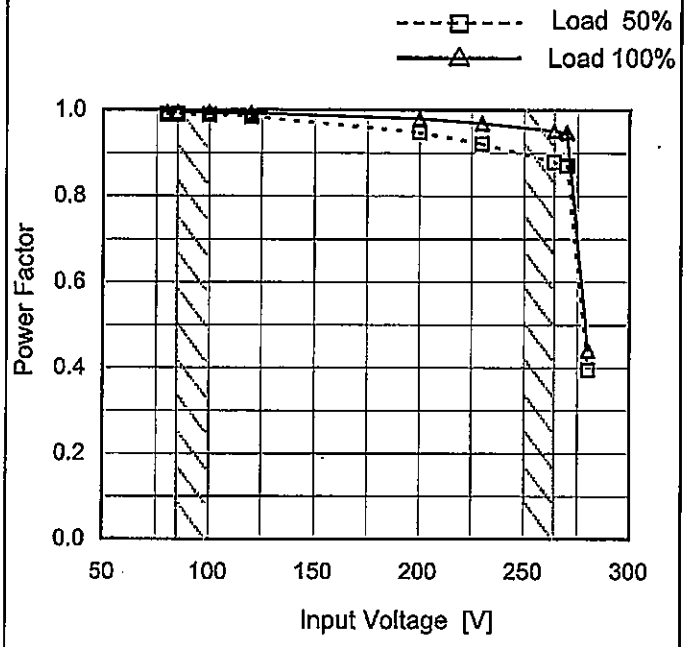
Model	TUNS50048
Item	Power Factor (by Input Voltage)
Object	———————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated input voltage.

2.Values

Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
80	0.989	0.995
85	0.990	0.994
100	0.989	0.994
120	0.985	0.993
200	0.948	0.980
230	0.921	0.969
264	0.880	0.952
270	0.870	0.948
280	0.395	0.441

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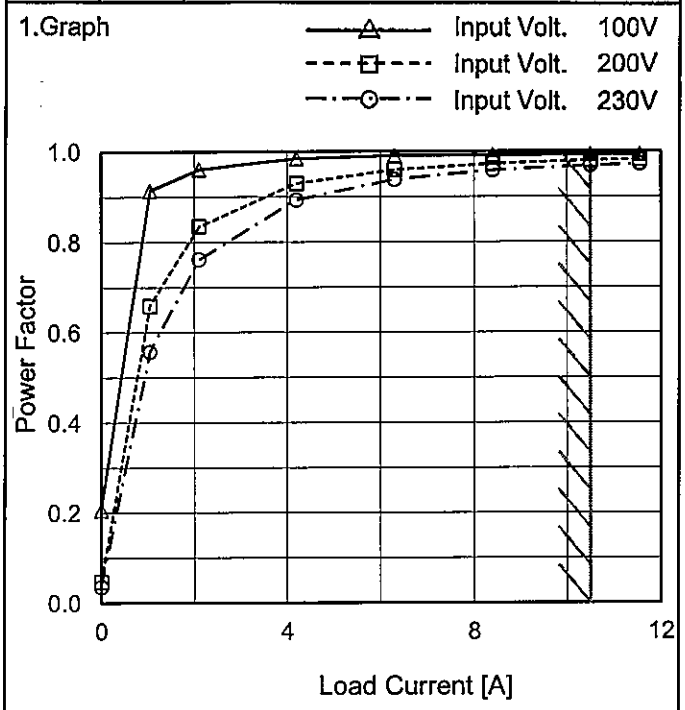
Model	TUNS50048
Item	Power Factor (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Power Factor		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	0.206	0.047	0.036
1.05	0.914	0.659	0.557
2.10	0.961	0.835	0.762
4.20	0.985	0.930	0.894
6.30	0.991	0.960	0.938
8.40	0.992	0.973	0.959
10.50	0.994	0.980	0.969
11.55	0.994	0.983	0.973
--	-	-	-
--	-	-	-
--	-	-	-

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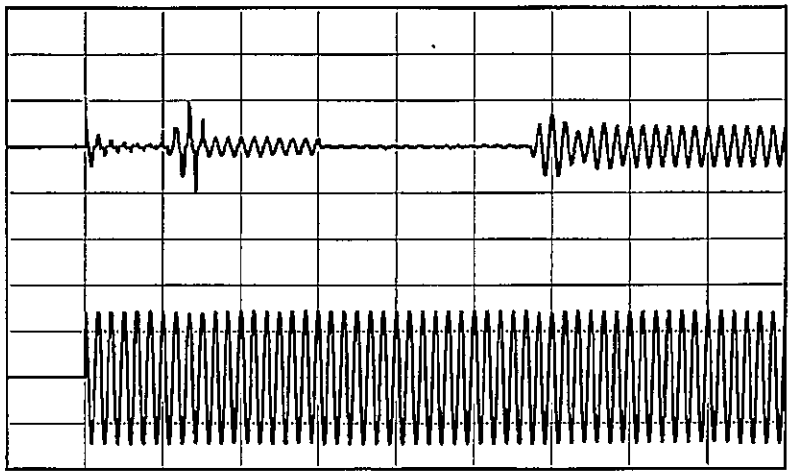
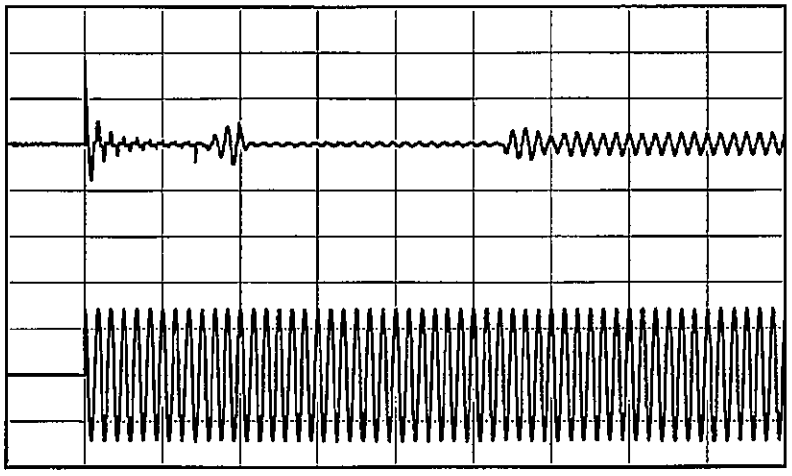
Model	TUNS50048
Item	Inrush Current
Object	———

Temperature 25°C
Testing Circuitry Figure A



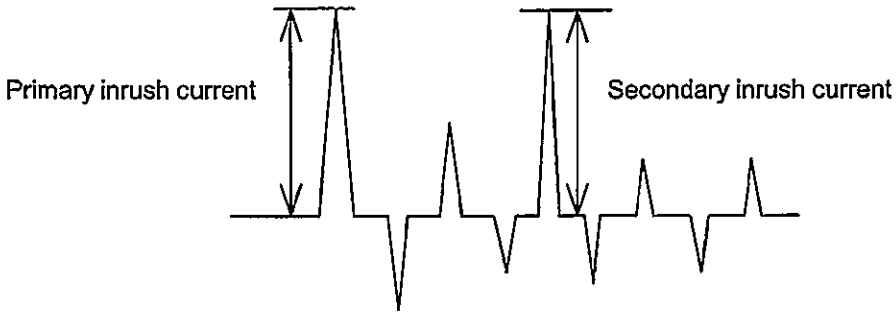
Input Voltage 100 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
20.7 A
Secondary inrush current :
19.3 A



Input Voltage 200 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
35.9 A
Secondary inrush current :
9.1 A



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Model	TUNS50048		
Item	Leakage Current	Temperature 25°C Testing Circuitry Figure B	
Object	———————		

1.Results

[mA]

Standards		Input Volt.			Note
		100 [V]	200 [V]	240[V]	
IEC60950-1	Both phases	0.16	0.33	0.40	Operation
	One of phase	0.30	0.63	0.77	stand by

The value for "One phase" is the reference value only.

2.Condition

Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

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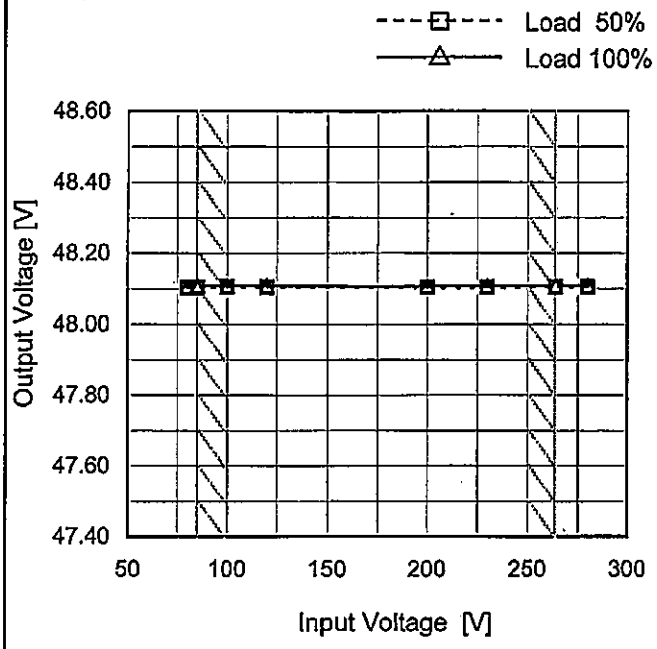
Model	TUNS50048
Item	Line Regulation
Object	+48V10.5A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated input voltage.

2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
80	48.102	48.105
85	48.104	48.108
100	48.105	48.109
120	48.105	48.109
200	48.104	48.108
230	48.104	48.108
264	48.105	48.109
280	48.105	48.109
--	-	-

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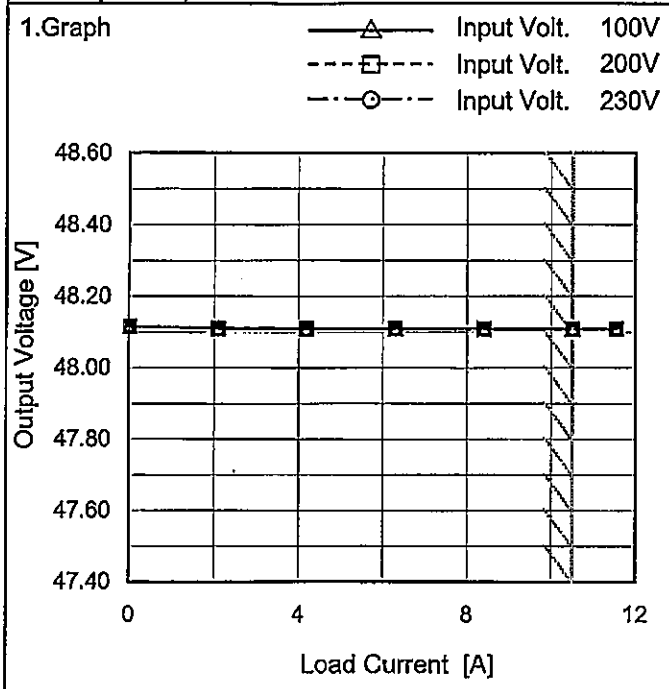
Model	TUNS50048
Item	Load Regulation
Object	+48V10.5A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	48.116	48.115	48.116
2.10	48.110	48.110	48.110
4.20	48.110	48.109	48.109
6.30	48.110	48.109	48.109
8.40	48.109	48.109	48.109
10.50	48.109	48.108	48.108
11.55	48.110	48.109	48.109
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	TUNS500F48
Item	Dynamic Load Response
Object	+48V 10.5A

Temperature 25℃
Testing Circuitry Figure A

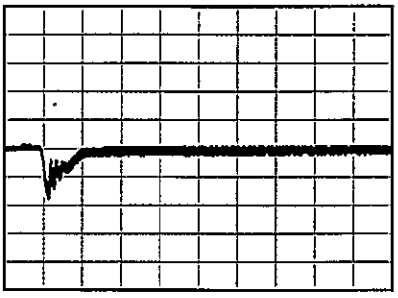
Input Volt. 100V
Cycle 1000ms

Load Current

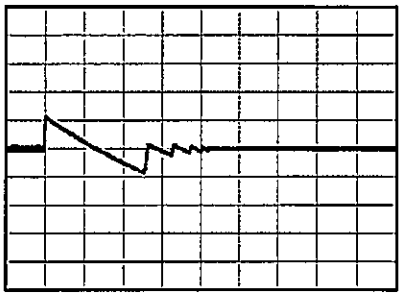
10.5A / 50us

Min.Load (0A)⟷
Load 100%(10.5A)

1 V/div



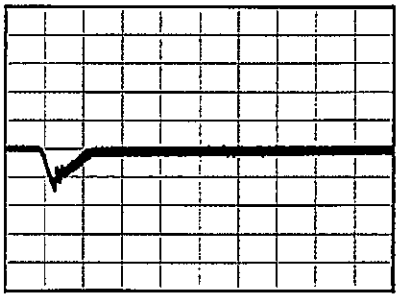
400 us/div



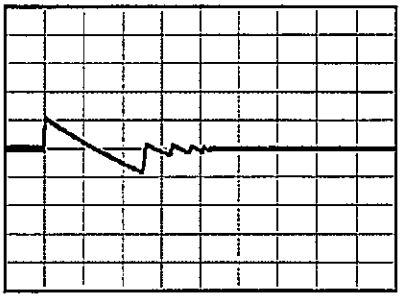
20 ms/div

Min.Load (0A)⟷
Load 50%(5.25A)

1 V/div



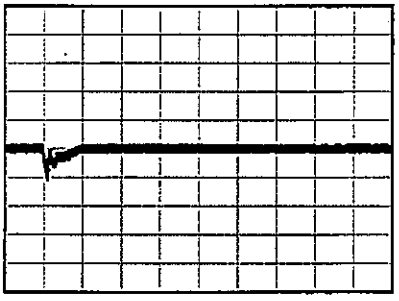
400 us/div



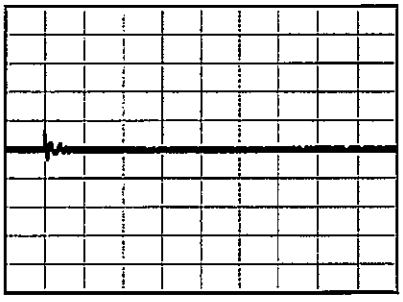
20 ms/div

Load 10% (1.05A)⟷
Load 100% (10.5A)

1 V/div



400 us/div



20 ms/div

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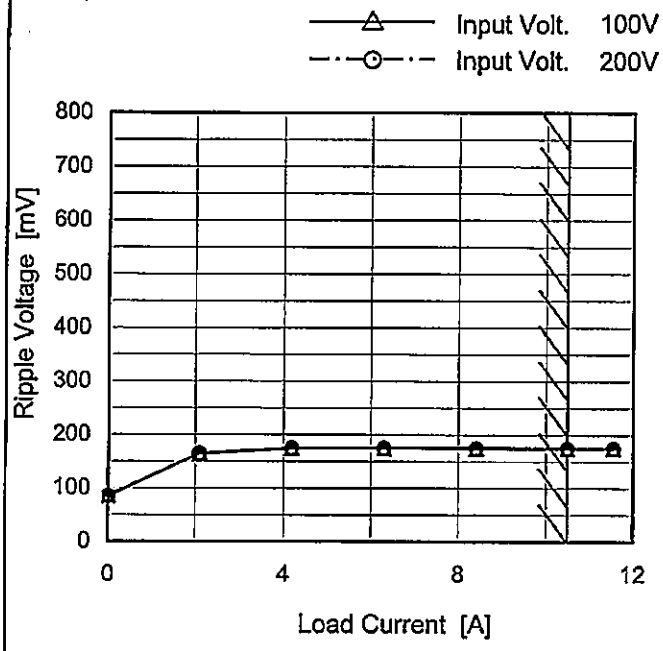
Model	TUNS500F48
Item	Ripple Voltage (by Load Current)
Object	+48V10.5A

Temperature 25°C
Testing Circuitry Figure C

1.Graph



Measured by 100 MHz Oscilloscope.
Ripple Voltage is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated load current.

T1: Due to AC Input Line
T2: Due to Switching

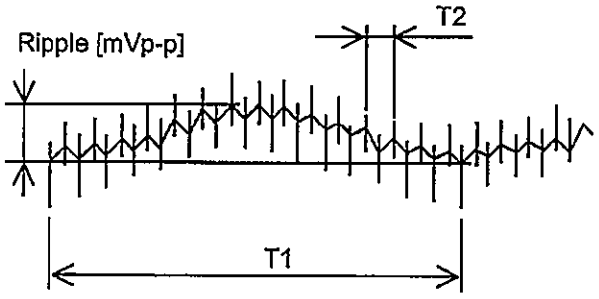


Fig. Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.0	85	85
2.1	165	165
4.2	175	175
6.3	175	175
8.4	175	175
10.5	175	175
11.6	175	175
--	-	-
--	-	-
--	-	-
--	-	-

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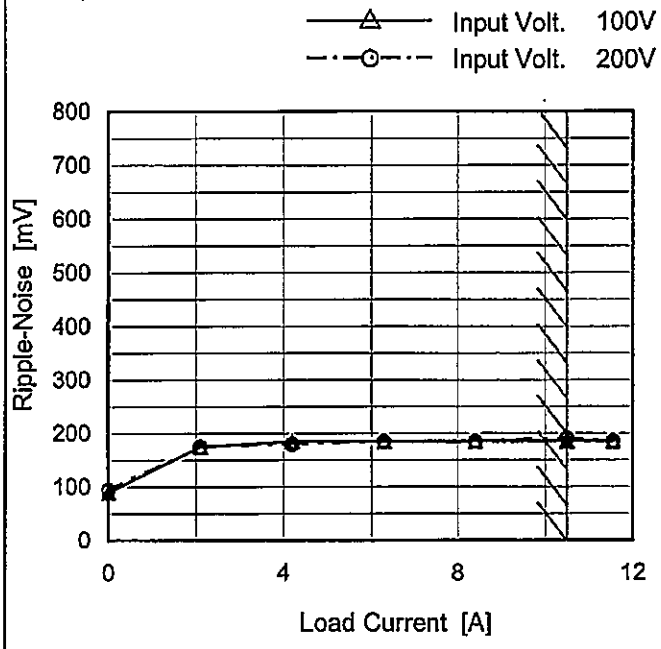
Model	TUNS500F48
Item	Ripple-Noise
Object	+48V10.5A

Temperature 25°C
Testing Circuitry Figure C

1.Graph



Measured by 100 MHz Oscilloscope.
Ripple-Noise is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.0	90	95
2.1	175	175
4.2	185	180
6.3	185	185
8.4	185	185
10.5	185	190
11.6	185	185
--	-	-
--	-	-
--	-	-
--	-	-

T1: Due to AC Input Line
T2: Due to Switching

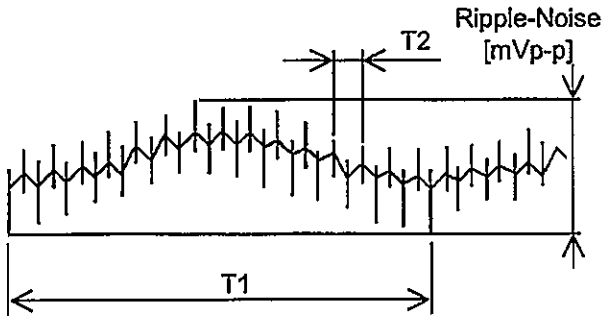
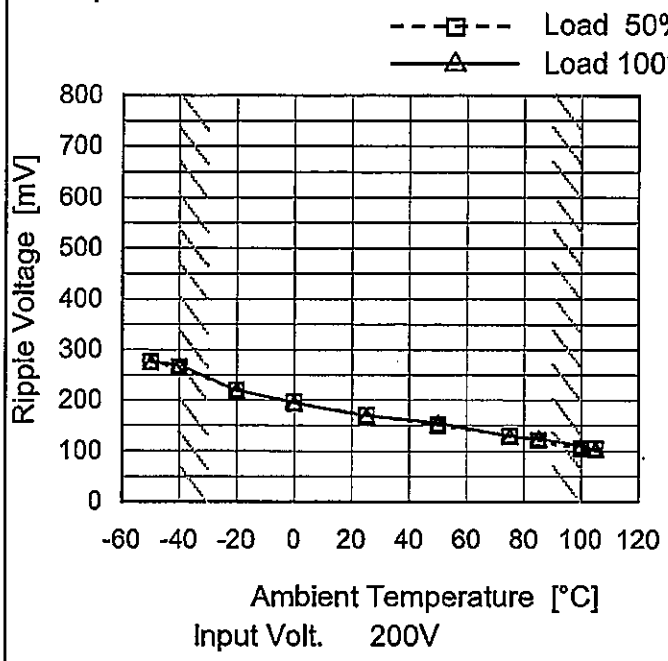


Fig. Complex Ripple Wave Form

Model	TUNS500F48
Item	Ripple Voltage (by Ambient Temp.)
Object	+48V10.5A

Testing Circuitry Figure C

1.Graph



Input Volt. 200V

Measured by 100 MHz Oscilloscope.
Note: Slanted line shows the range of the rated ambient temperature.

2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-50	275	275
-40	265	270
-20	220	220
0	195	195
25	170	170
50	150	155
75	130	130
85	120	125
100	105	110
105	105	105
--	-	-

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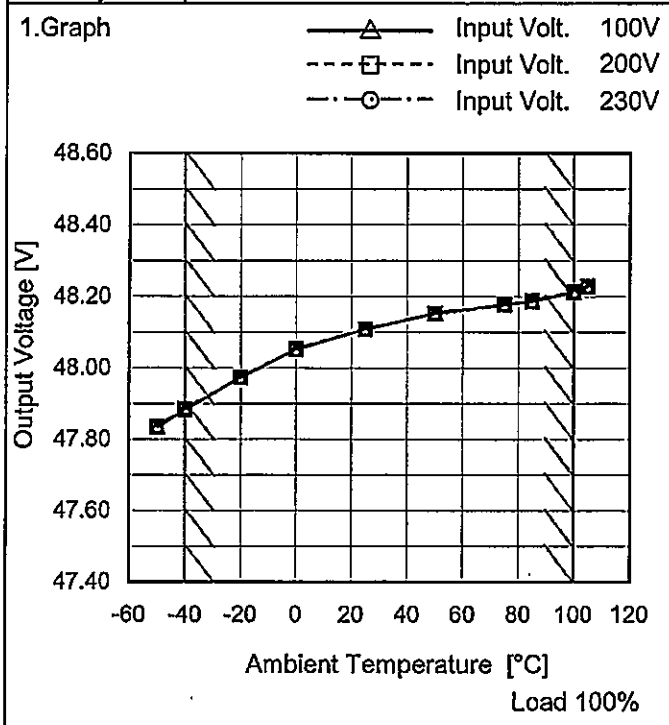
Model	TUNS50048
Item	Ambient Temperature Drift
Object	+48V10.5A

Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated ambient temperature.

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
-50	47.834	47.836	47.837
-40	47.884	47.885	47.885
-20	47.973	47.974	47.974
0	48.051	48.052	48.053
25	48.109	48.108	48.108
50	48.152	48.152	48.153
75	48.177	48.178	48.178
85	48.187	48.187	48.188
100	48.212	48.214	48.214
105	48.227	48.229	48.229
--	-	-	-

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Model	TUNS50048	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+48V10.5A	

1.Output Voltage Accuracy

This is defined as the value of the output voltage, regulation load, ambient temperature and input voltage varied at random in the range as specified below.

Temperature : -40 - 100°C
Input Voltage : 85 - 264V
Load Current : 0 - 10.5A

* Output Voltage Accuracy = ±(Maximum of Output Voltage - Minimum of Output Voltage) / 2

$$\text{* Output Voltage Accuracy (Ration)} = \frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$$

2.Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	100	85	0	48.221	±170	±0.4
Minimum Voltage	-40	85	10.5	47.881		

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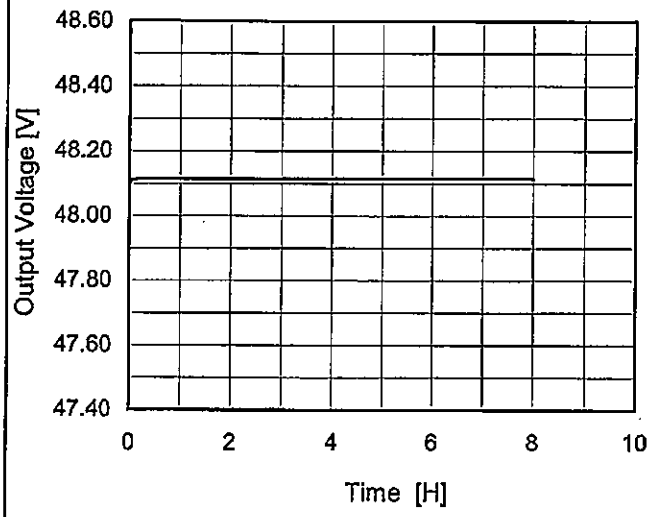
Model	TUNS50048
Item	Time Lapse Drift
Object	+48V10.5A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Input Volt. 100V
Load 100%

* The characteristic of AC200V is equal.

2.Values

Time since start [H]	Output Voltage [V]
0.0	48.098
0.5	48.113
1.0	48.113
2.0	48.114
3.0	48.114
4.0	48.114
5.0	48.114
6.0	48.114
7.0	48.114
8.0	48.114

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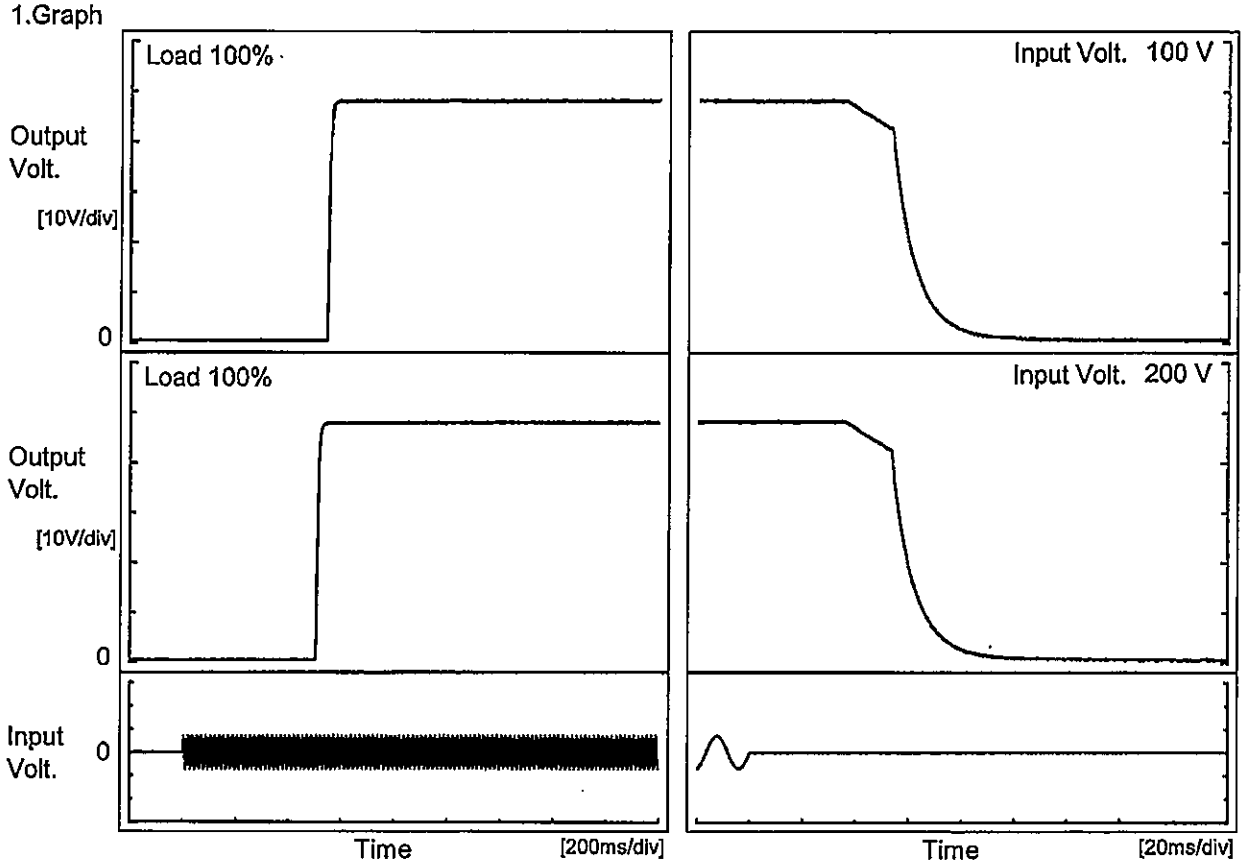
Model	TUNS50048	
Item	Rise and Fall Time	Temperature 25°C Testing Circuitry Figure A
Object	+48V10.5A	

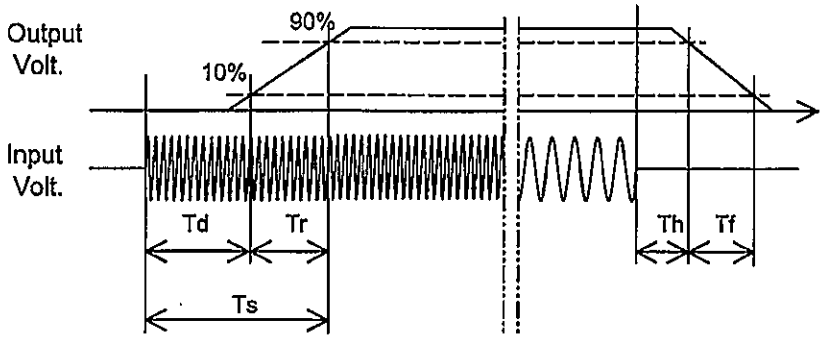
1.Graph



2.Values

[ms]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
100 V	547.0	15.0	562.0	50.2	22.4
200 V	506.0	14.0	520.0	50.5	22.1



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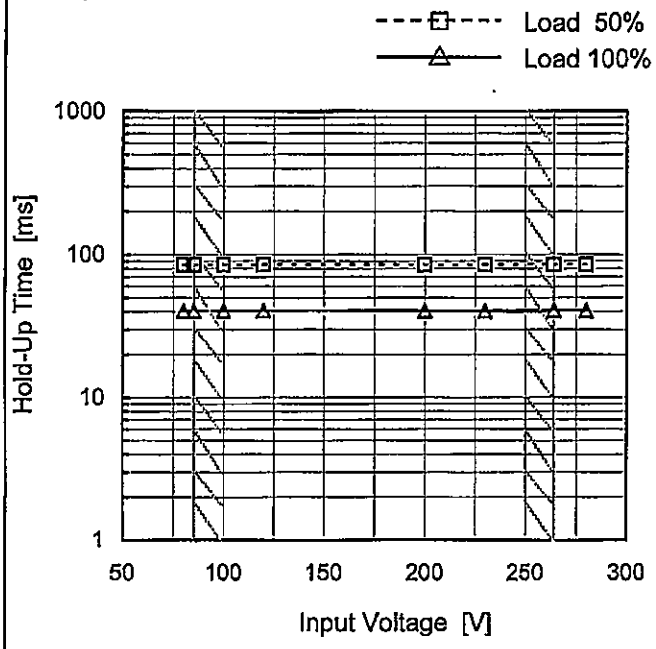
Model	TUNS50048
Item	Hold-Up Time
Object	+48V10.5A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.
Note: Slanted line shows the range of the rated input voltage.

2.Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
80	85	40
85	85	40
100	85	41
120	85	41
200	85	41
230	85	40
264	85	41
280	85	41
--	-	-

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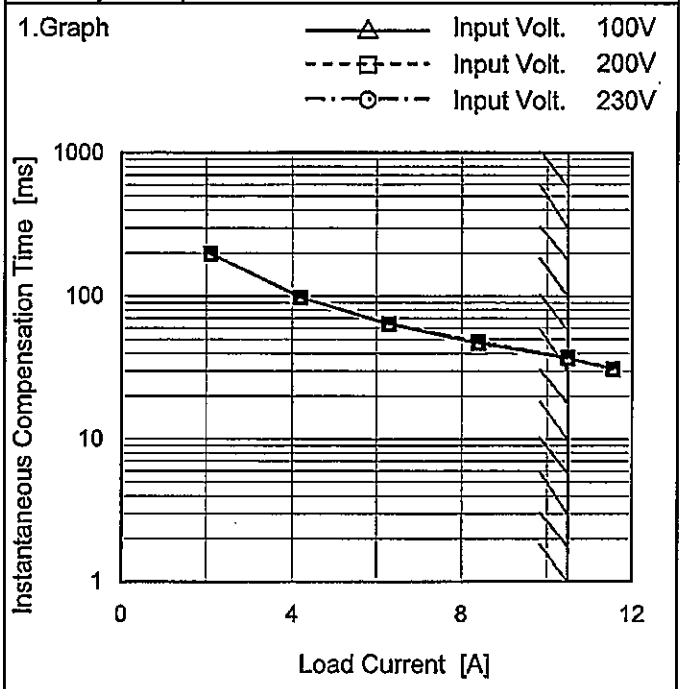
Model	TUNS50048
Item	Instantaneous Interruption Compensation
Object	+48V10.5A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

2.Values

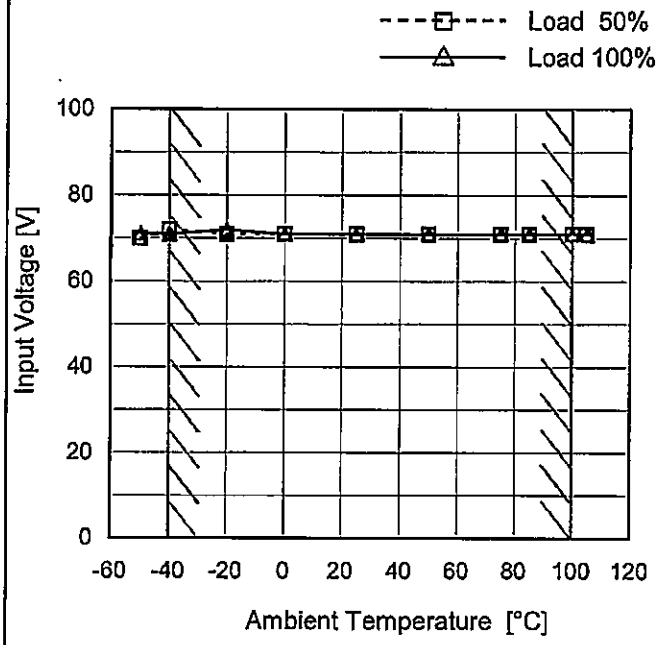
Load Current [A]	Time [ms] Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	-	-	-
2.10	198	198	198
4.20	98	98	98
6.30	64	64	64
8.40	47	48	48
10.50	37	37	37
11.55	31	31	31
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	TUNS50048
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+48V10.5A

Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated ambient temperature.

2.Values

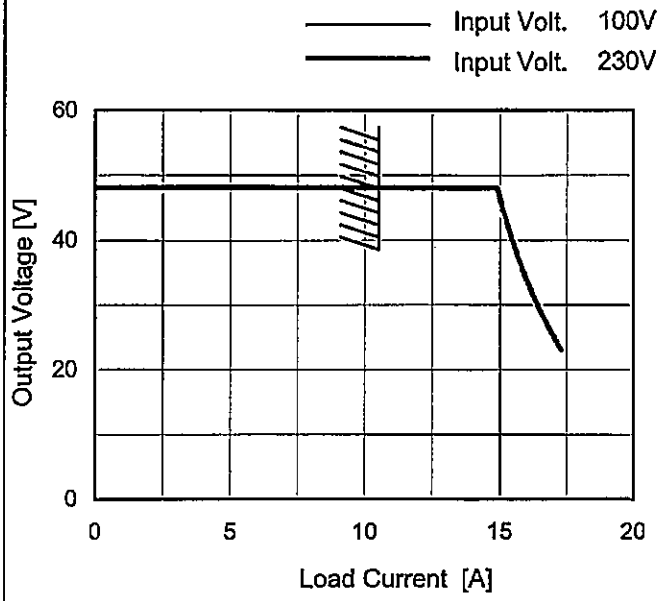
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-50	70	71
-40	72	71
-20	71	72
0	71	71
25	71	71
50	71	71
75	71	71
85	71	71
100	71	71
105	71	71
--	-	-

COSEL

Model	TUNS50048
Item	Overcurrent Protection
Object	+48V10.5A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

Intermittent operation occurs when the output voltage is from 24V to 0V.

2.Values

Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 230[V]
48.0	10.58	10.58
45.6	15.03	15.05
43.2	15.18	15.22
38.4	15.57	15.59
33.6	16.02	16.03
28.8	16.53	16.54
24.0	17.14	17.14
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

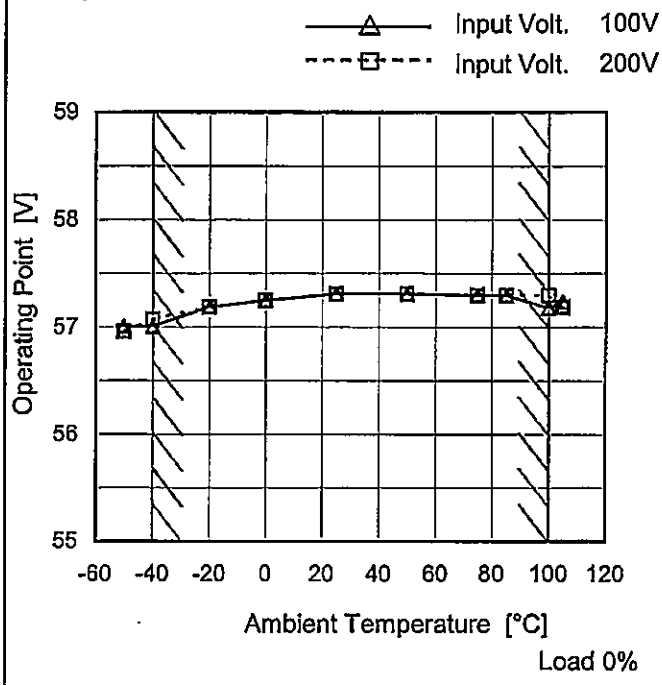
BC-10853

COSEL

Model	TUNS50048
Item	Overvoltage Protection
Object	+48V10.5A

Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated ambient temperature.

2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 200[V]
-50	57.01	56.96
-40	57.01	57.07
-20	57.19	57.19
0	57.25	57.25
25	57.31	57.31
50	57.31	57.31
75	57.30	57.30
85	57.30	57.30
100	57.18	57.30
105	57.24	57.19
--	-	-

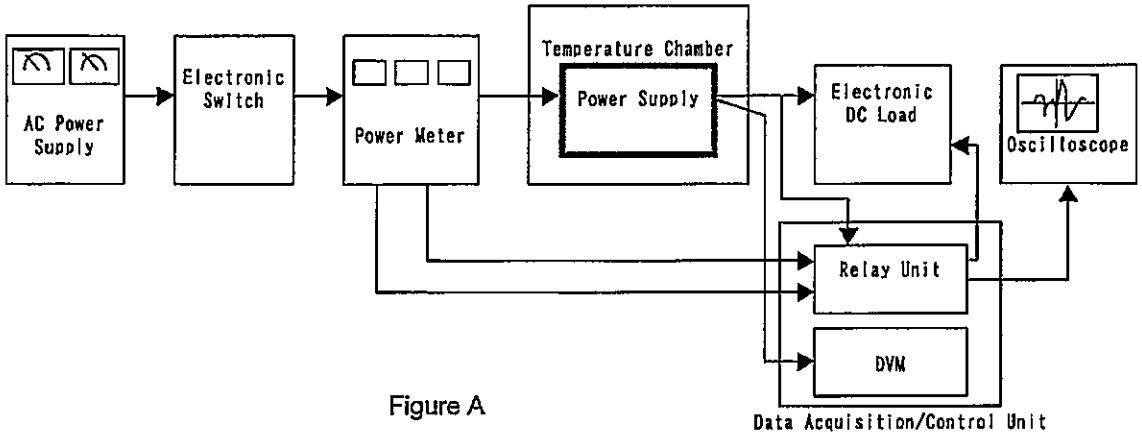


Figure A

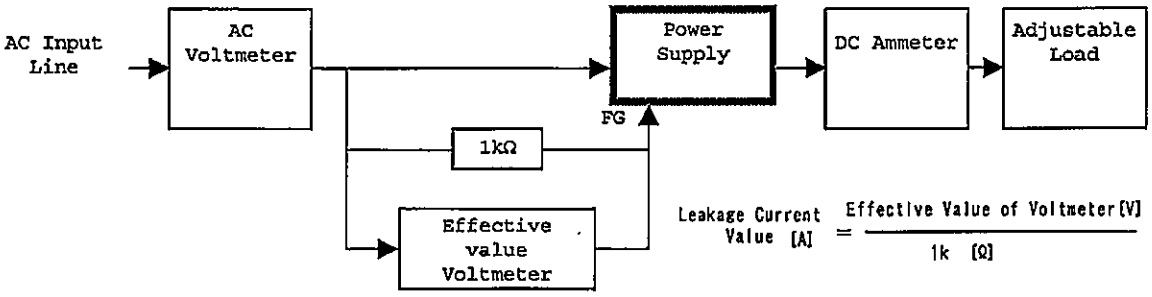


Figure B (DEN-AN)

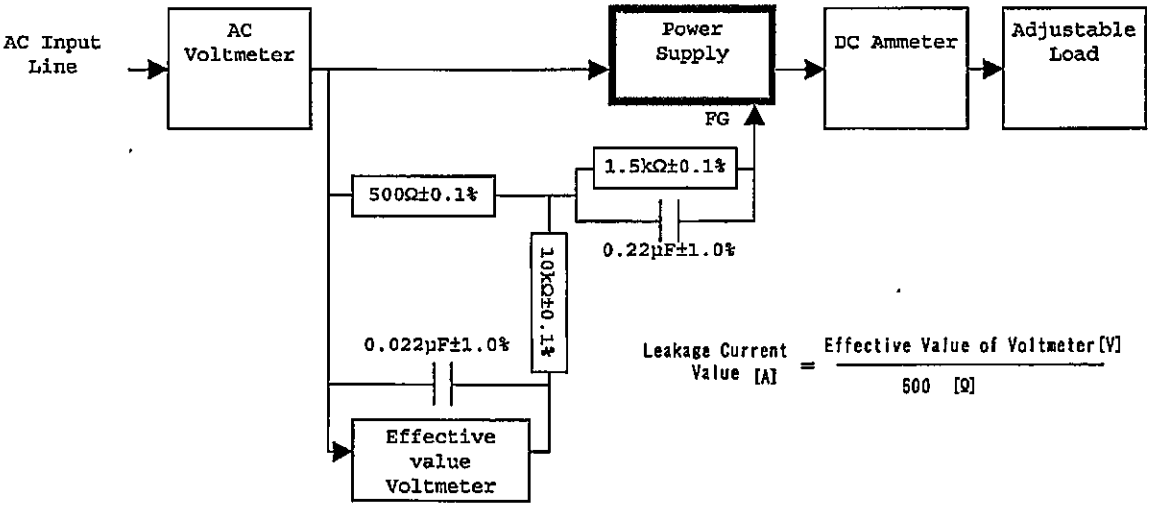
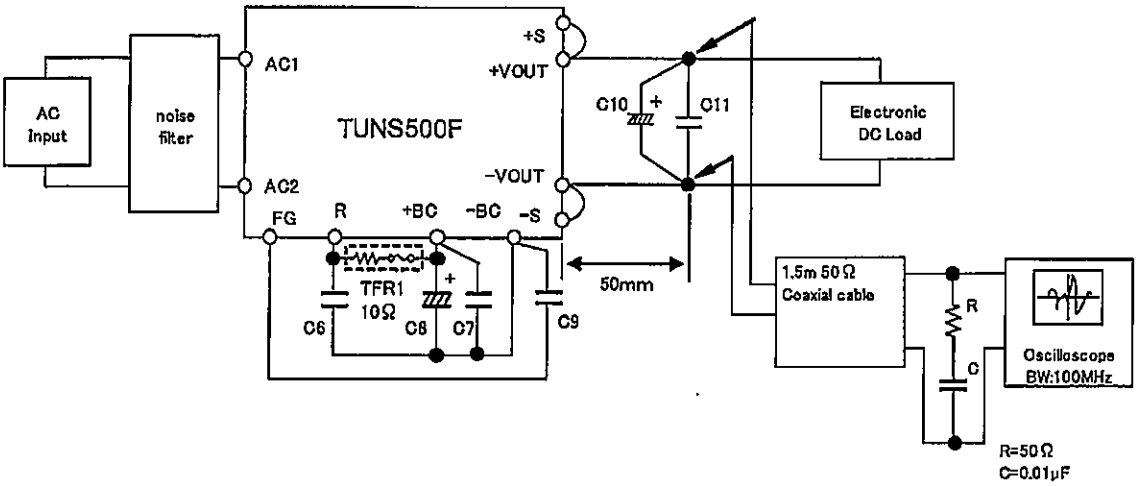


Figure B (IEC60950-1)

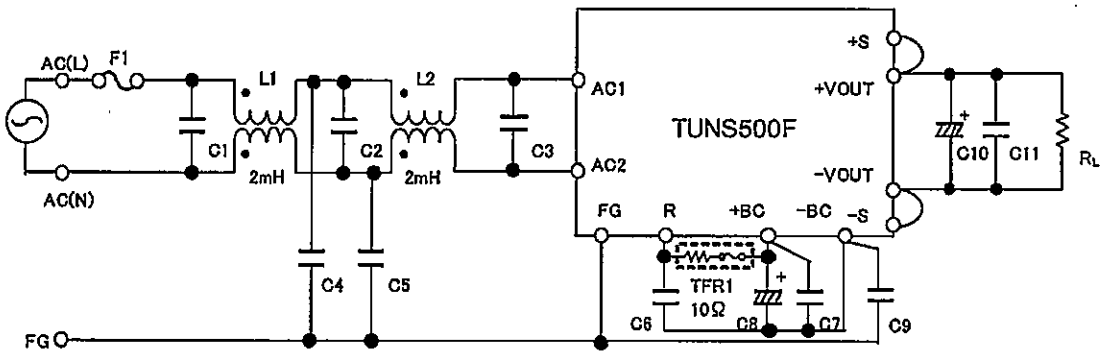
COSEL



C10 : TUNS500F12 2200μF (0≦Tc≦100)
2200μF×3 (-40≦Tc<0)
TUNS500F28 1000μF (0≦Tc≦100)
1000μF×3 (-40≦Tc<0)
TUNS500F48 470μF (0≦Tc≦100)
470μF×3 (-40≦Tc<0)
Tc:Base Plate Temp.

C11 : TUNS500F12 10μF
TUNS500F28 4.7μF
TUNS500F48 2.2μF

Figure C



L1,L2 : SC-15-200(NEC TOKIN)
C1,C2 : 0.68μF 310V Film Capacitor × 2
C3 : 1.0μF 310V Film Capacitor × 2
C4,C5,C9 : 2200pF Ceramic Capacitor
C6,C7 : 0.68μF 450V Film Capacitor × 2
C8 : 390μF 450V Electrolytic Capacitor × 2
C10 : TUNS500F12 2200μF 25V Electrolytic Capacitor
TUNS500F28 1000μF 50V Electrolytic Capacitor
TUNS500F48 470μF 63V Electrolytic Capacitor

C11 : TUNS500F12 10μF Ceramic Capacitor
TUNS500F28 4.7μF Ceramic Capacitor
TUNS500F48 2.2μF Ceramic Capacitor

Figure D